Industrial Internship Report on

E Commerce Website

Prepared by

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Executive Summary
This report provides details of the Industrial Internship provided by upskill Campus and The IoT Academy in collaboration with Industrial Partner UniConverge Technologies Pvt Ltd (UCT). This internship was focused on a project/problem statement provided by UCT. We had to finish the project including the report in 6 weeks' time. My project was about developing an e-commerce website for automotive parts. The site allowed users to browse parts by make, model, or category, view product details including specifications and reviews, and make purchases via a secure payment gateway. Key features included an intelligent search function, persistent shopping cart, customer accounts for order history, and an admin interface for managing inventory, orders, and marketing. The project also involved integrations with suppliers and logistics services for streamlined operations This internship gave me a very good opportunity to get exposure to Industrial problems and design/implement solution for that. It was an overall great experience to have this internship.

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1 Preface

During the six-week internship, I worked on the development of an e-commerce platform focused on selling automotive parts. The project involved both front-end and back-end development, integrating key features like product browsing by make or model, a shopping cart that persisted across sessions, secure payment processing, and an admin panel for managing products, inventory, and orders.

This internship provided hands-on experience in full-stack web development and project management. Internships are crucial for career development as they offer the chance to apply theoretical knowledge in real-world settings, enhance technical and problem-solving skills, and give exposure to industry tools and practices. In particular, working on a live project helped me understand the importance of scalable solutions and robust architecture, which are essential for future roles in the tech industry.

The project was to build an e-commerce website for automotive parts, which included features such as intelligent search, product filtering by vehicle specifications, a secure payment system, and an admin interface for managing orders and inventory. The challenge was to create a user-friendly, efficient platform that could handle real-time inventory updates, secure transactions, and provide seamless logistics integration.

The program, supported by USC/UCT, offered valuable exposure to industry standards and allowed me to collaborate with professionals and mentors who guided me throughout the project. This opportunity also gave me access to resources and tools that enhanced my learning and project development, significantly contributing to my growth as a developer

The program was well-structured, starting with an orientation and initial planning phase, followed by weekly sprints that included milestone setting, coding, testing, and feedback sessions. Each week focused on specific deliverables, such as building the product catalog, integrating payment gateways, or developing the admin panel, ensuring consistent progress throughout the internship. Regular mentorship and review meetings ensured that the project stayed aligned with industry standards.

Throughout this six-week internship, I gained invaluable experience in full-stack web development, specifically in e-commerce. I learned how to design and build scalable, user-friendly systems by integrating front-end technologies like React with back-end services and databases. Developing the intelligent search functionality and working on the product catalog taught me how to manage complex data structures and ensure fast search response times.

I worked on it solo

2 Introduction

2.1 About UniConverge Technologies Pvt Ltd

A company established in 2013 and working in Digital Transformation domain and providing Industrial solutions with prime focus on sustainability and RoI.

For developing its products and solutions it is leveraging various **Cutting Edge Technologies e.g. Internet of Things (IoT), Cyber Security, Cloud computing (AWS, Azure), Machine Learning, Communication Technologies (4G/5G/LoRaWAN), Java Full Stack, Python, Front end** etc.

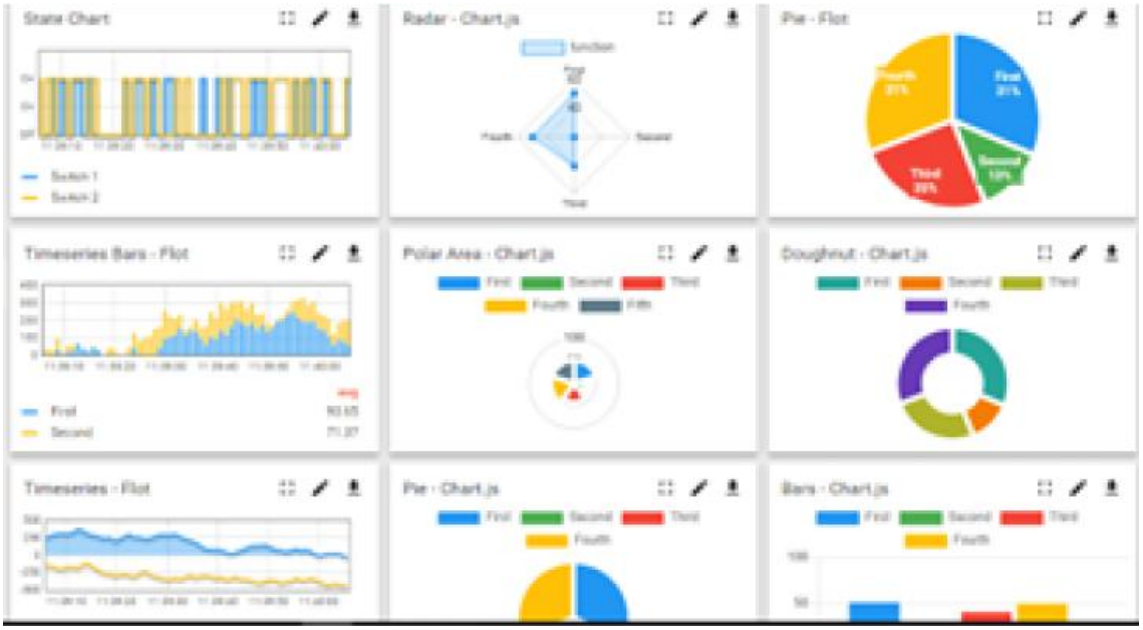
i. UCT IoT Platform (uct Insight)

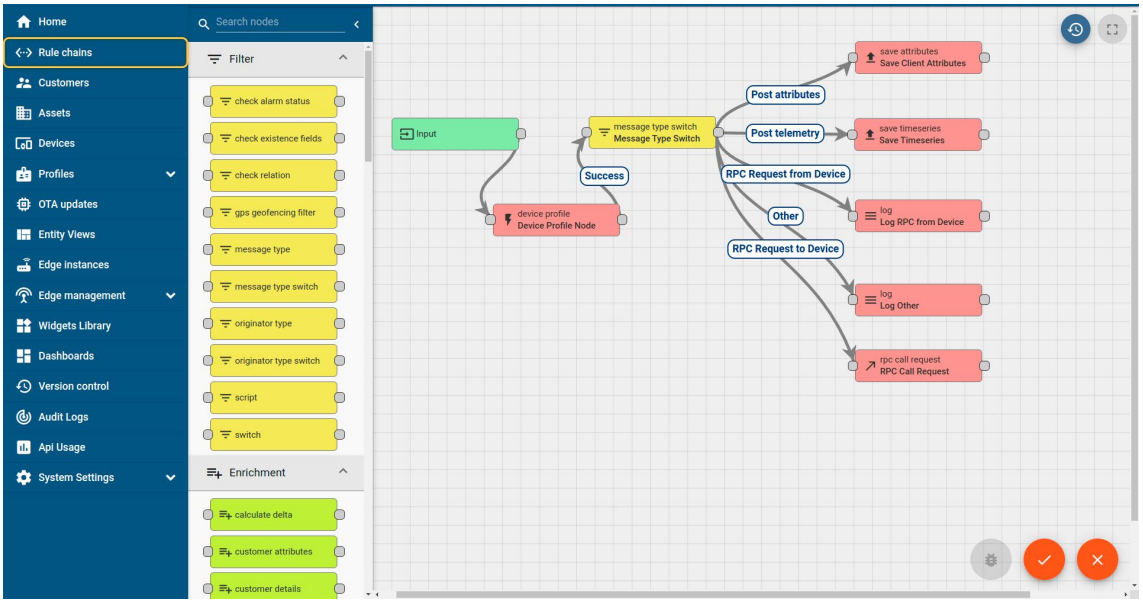
UCT Insight is an IOT platform designed for quick deployment of IOT applications on the same time providing valuable "insight" for your process/business. It has been built in Java for backend and ReactJS for Front end. It has support for MySQL and various NoSql Databases.

- It enables device connectivity via industry standard IoT protocols - MQTT, CoAP, HTTP, Modbus TCP, OPC UA
- It supports both cloud and on-premises deployments.

It has features to

- Build Your own dashboard
- Analytics and Reporting
- Alert and Notification
- Integration with third party application(Power BI, SAP, ERP)
- Rule Engine





ii. Smart Factory Platform (FACTORY WATCH)

Factory watch is a platform for smart factory needs.

It provides Users/ Factory

- with a scalable solution for their Production and asset monitoring
- OEE and predictive maintenance solution scaling up to digital twin for your assets.
- to unleased the true potential of the data that their machines are generating and helps to identify the KPIs and also improve them.
- A modular architecture that allows users to choose the service that they what to start and then can scale to more complex solutions as per their demands.

Its unique SaaS model helps users to save time, cost and money.

Machine	Operator	Work Order ID	Job ID	Job Performance	Job Progress		Output		Rejection	Time (mins)				Job Status	End Customer
					Start Time	End Time	Planned	Actual		Setup	Pred	Downtime	Idle		
CNC_S7_81	Operator 1	WO0405200001	4168	58%	10:30 AM		55	41	0	80	215	0	45	In Progress	i
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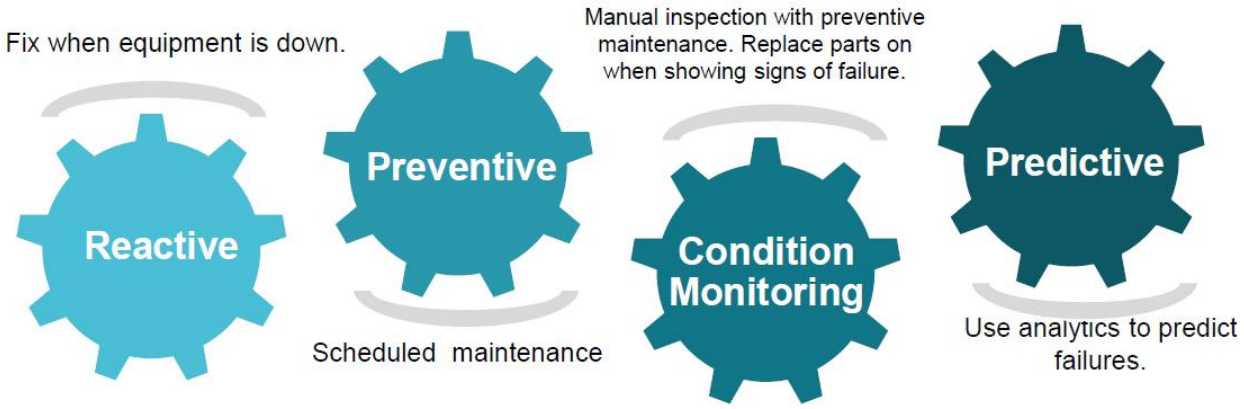
iii. LoRaWAN based Solution

UCT is one of the early adopters of LoRAWAN teschnology and providing solution in Agritech, Smart cities, Industrial Monitoring, Smart Street Light, Smart Water/ Gas/ Electricity metering solutions etc.

iv. Predictive Maintenance

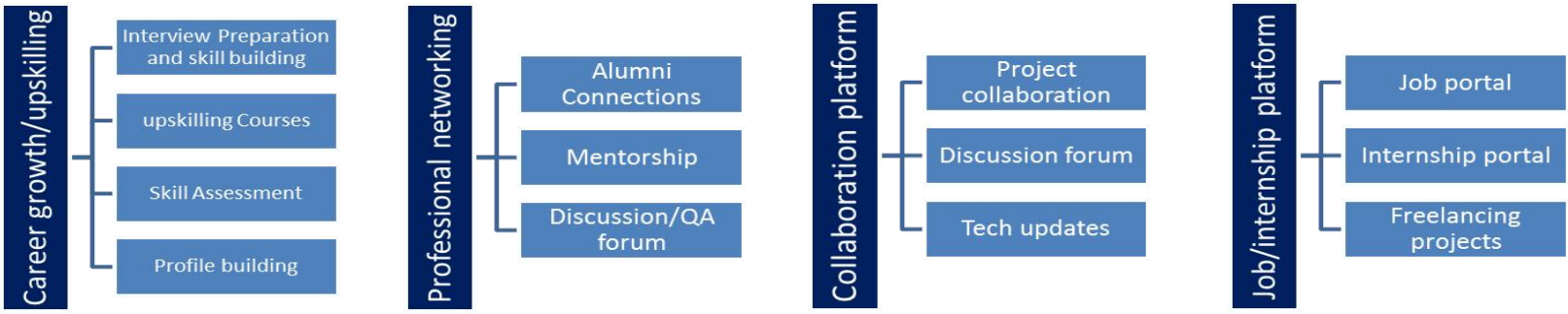
UCT is providing Industrial Machine health monitoring and Predictive maintenance solution leveraging Embedded system, Industrial IoT and Machine Learning Technologies by finding Remaining useful life time of various Machines used in production process.



2.2 About upskill Campus (USC)

upskill Campus along with The IoT Academy and in association with Uniconverge technologies has facilitated the smooth execution of the complete internship process.

USC is a career development platform that delivers **personalized executive coaching** in a more affordable, scalable and measurable way.



2.3 The IoT Academy

The IoT academy is EdTech Division of UCT that is running long executive certification programs in collaboration with EICT Academy, IITK, IITR and IITG in multiple domains.

2.4 Objectives of this Internship program

The objective for this internship program was to

- ☛ get practical experience of working in the industry.
- ☛ to solve real world problems.
- ☛ to have improved job prospects.
- ☛ to have Improved understanding of our field and its applications.
- ☛ to have Personal growth like better communication and problem solving.

2.5 Reference

[1] Article on optimizing e-commerce websites: https://www.smashingmagazine.com/2021/02/improve-ecommerce-site-performance/

[2] Online forums

[3]

2.6 Glossary

Terms	Acronym

3 Problem Statement

The goal of the project was to develop a user-friendly e-commerce platform for selling automotive parts and accessories. The platform needed to allow customers to easily search for parts by vehicle make, model, or category, view detailed product information, and securely complete their purchases. Additionally, the system had to efficiently manage product inventory, orders, and logistics while providing a robust admin interface for backend management.

Customers needed to quickly find the right parts for their vehicles based on various specifications. The search functionality had to be precise, fast, and capable of handling large inventories.

4 Existing and Proposed solution

Several existing e-commerce platforms sell automotive parts, such as:

1. **RockAuto**:
    - **Strengths**: Extensive catalog, vehicle-specific filtering, and good product detail.
    - **Limitations**: Limited user experience, outdated design, and lack of advanced search options.
2. **AutoZone**:
    - **Strengths**: Well-known brand, in-store pickup options, and integration with service centers.
    - **Limitations**: Poor mobile experience, slow website performance, and inconsistent product availability notifications.
3. **PartsGeek**:
    - **Strengths**: Large inventory and vehicle-specific part search.
    - **Limitations**: Lack of customer reviews, outdated design, limited payment options, and no personalized recommendations.

The proposed solution is to develop an e-commerce platform that focuses on solving these limitations by:

- **Intelligent Search and Filtering**: Implementing a robust search feature that not only allows customers to find parts by make, model, or category but also suggests related or alternative parts based on availability and compatibility.
- **Modern User Interface**: Designing a fast, mobile-optimized platform with a clean and intuitive user experience, ensuring smooth navigation and better user engagement.
- **Seamless Payment and Checkout**: Integrating multiple payment gateways like Stripe for a secure, reliable, and flexible payment process that ensures smooth transactions with options for various payment methods.
- **Real-Time Inventory and Supplier Integration**: Connecting with suppliers' databases and logistics systems in real-time, allowing for accurate inventory tracking, fast updates on availability, and efficient shipping coordination.

4.1 Code submission (Github link)

https://github.com/Jill-Prajapati/upskillcampus

4.2 Report submission (Github link) : first make placeholder, copy the link.

Github link : https://github.com/Jill-Prajapati/upskillcampus

5 Proposed Design/ Model

1. **Requirement Gathering and Analysis**:
    - **Objective**: Define functional and non-functional requirements.
    - **Activities**: Identify user needs, create user personas, map user journeys, and document specifications for features like intelligent search, payment integration, and inventory management.
2. **UI/UX Design**:
    - **Objective**: Develop intuitive interfaces for users and administrators.
    - **Activities**: Create wireframes and prototypes for customer and admin dashboards, optimize for mobile design, and conduct user testing for feedback on usability.
3. **Development and Implementation**:
    - **Objective**: Build the platform's front-end and back-end components.
    - **Activities**: Implement front-end interfaces and back-end logic, integrate third-party services (Stripe, logistics APIs), set up databases, and ensure secure user authentication.
4. **Testing and QA**:
    - **Objective**: Ensure platform functionality and security.
    - **Activities**: Conduct unit, integration, and end-to-end testing, perform load testing, and ensure data security. For ML components, evaluate model performance and adjust as necessary.
5. **Deployment and Scaling**:
    - **Objective**: Launch and scale the platform.
    - **Activities**: Deploy on cloud infrastructure (AWS, Azure), set up CI/CD pipelines for updates, implement monitoring tools for performance tracking, and prepare for future scalability as user and product volume grows.

6 Performance Test

Performance testing is crucial for validating the practical application of this e-commerce solution in real-world scenarios. This section outlines the identified constraints, how they were addressed in the design, and the performance outcomes of the testing.

Constraints Identified:

1. **Memory Usage**: The application must efficiently handle multiple user sessions and data retrieval without excessive memory consumption.
2. **Accuracy**: Search results and product recommendations must be relevant and precise to meet user expectations.
3. **Durability**: The system must remain operational under heavy loads, especially during peak shopping times.

6.1 Test Plan/ Test Cases

- **Load Testing**: Simulate multiple concurrent users to assess system performance.
- **Stress Testing**: Determine the maximum load the system can handle before failure.
- **Response Time Testing**: Measure the time taken for search queries and checkout processes.
- **Accuracy Testing**: Evaluate the relevance of search results and recommendations.

6.2 Test Procedure

- Utilize testing tools (e.g., JMeter, LoadRunner) to simulate user load.
- Monitor system performance metrics (CPU, memory, response time) during tests.
- Collect and analyze data to identify bottlenecks and performance issues.

6.3 Performance Outcome

The performance tests demonstrated that the e-commerce platform can efficiently manage resource constraints while providing a fast and reliable user experience. Recommendations for future improvements include ongoing monitoring of performance metrics and periodic optimization of algorithms as user load increases.

7 My learnings

Through the development of the e-commerce website for automotive parts, I acquired a range of skills and insights that will significantly contribute to my career advancement in the tech and retail sectors.

1. **Technical Proficiency**: I enhanced my knowledge of web development technologies, including React for the front-end and Node.js for the back-end. Understanding these frameworks is essential for building modern web applications, and this technical expertise will be invaluable in my future roles.

2. **E-commerce Functionality**: I gained hands-on experience with essential e-commerce features such as shopping cart functionality, secure payment gateways, and user authentication. Familiarity with these components is crucial for a successful career in e-commerce development or management.

3. **User Experience (UX) Design**: I learned the importance of creating intuitive interfaces that enhance user experience. Conducting user testing and gathering feedback allowed me to appreciate how UX design impacts customer satisfaction and conversion rates.

4. **Data Management and Integration**: I developed skills in managing product databases and integrating third-party services for payment processing and logistics. This experience is crucial in understanding how to create a seamless experience for users while ensuring efficient backend operations.

5. **Project Management and Collaboration**: The project required effective collaboration and communication with team members, enabling me to manage tasks efficiently and meet deadlines. These soft skills are essential for career success in any field.

6. **Market Understanding**: I gained insights into the automotive parts industry and the dynamics of online retail. Understanding market trends and customer behavior will inform my future projects and decisions in the e-commerce landscape.

Overall, this e-commerce project has equipped me with practical skills and a deep understanding of the e-commerce ecosystem. I am now better prepared for roles in web development

8 Future work scope

Some future development ideas can be:

1. **Advanced Search Functionality**: Implementing a more sophisticated search engine that utilizes natural language processing (NLP) to allow users to find parts using conversational queries would significantly enhance the user experience.

2. **Recommendation System**: Developing a personalized recommendation engine based on user behavior and preferences could help increase sales by suggesting related products to customers.

3. **Mobile Application**: Creating a mobile application would extend the platform's reach, providing users with the convenience of shopping on-the-go and enhancing overall engagement.